

REMARKS

Claims 1-2, 4, and 6-32 are pending. By this Amendment, no claims are cancelled, claims 1-2, 4, and 6-32 are amended and new claims 34-35 are added. Support for the amendments can be found throughout the application as originally filed, such as, for example, at page 1, lines 8 – 15; page 4, line 16 – page 5, line 10; page 7, lines 1 – 11; page 10, lines 14 – 23; page 11, line 23 – page 12, line 28. Therefore, no new matter is introduced by way of this Amendment.

Claim Rejections – 35 U.S.C. §§ 102 and 103

Claims 1-2, 4, 6-13, 16-19, 21-23, 25-28, 30, and 32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,070,483 to Berni. Claim 14 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Berni and further in view of U.S. Patent No. 6,134,966 to Donskoy. Claims 15, 20, 29, and 31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Berni. Insofar as the rejections apply to the amended claims and the new claims, the rejections are respectfully traversed for at least the reasons set forth below.

Claim 21 has been amended to recite a method of seismic exploration comprising: generating a seismic event; applying the seismic event to a body of water having a sea bottom; detecting a response to the seismic event within a detection area of a sea bottom from a position spaced apart from the sea bottom, the response including P-waves and S-waves resulting from the seismic event; and analyzing the response; wherein detecting monitoring successively each of a plurality of non-discrete, overlapping segments defining the detection area to ascertain movements of particles in the detection area over a response period and recording a detected response to the seismic event, the response period being a predetermined period of time after the

seismic event; analyzing the response includes analyzing the movements of the particles in the detection area of the sea bottom ascertained during the response period; and monitoring includes using a monitoring apparatus which is moved relative to the earth's surface during the response period. Claim 21 has been amended to recite an apparatus for carrying out seismic exploration comprising: a seismic event generator; a seismic delivery device adapted to apply the seismic event to a body of water having a sea bottom; a detecting apparatus adapted to detect within a detection area of the sea bottom a response to the seismic event, the response including P-waves and S-waves resulting from the seismic event, the detecting apparatus being spaced apart from the sea bottom; and an analyzer; wherein the detecting apparatus includes a monitoring apparatus adapted to monitor successively each of a plurality of non-discrete, overlapping segments defining the detection area to ascertain movements of particles in the detection area, over a response period and recording apparatus adapted to record a detected response to the seismic event, the response period being a predetermined response period after the seismic event; and the monitoring apparatus is adapted to move relative to the sea bottom during the response period.

Claims 1 and 21, as amended, are allowable at least because Berni fails to disclose the step of or an apparatus for monitoring successively each of a plurality of non-discrete, overlapping segments defining a detection area. In particular, Berni fails to disclose a moving detection area. Rather, Berni discloses a system capable only of detecting the movement of particles in response to a seismic event at one specific location. In other words, the detection area disclosed by Berni is stationary. In fact, Berni teaches away from a moving detection area in order to avoid the difficulties involved in picking up and relocating a large number of convention geophone-style detectors in a land-based survey.

Figure 1 of Berni shows that moving an array of detectors from one position to another is a very difficult and time consuming operation. Furthermore, the marine streamer cable disclosed by Berni does not monitor any particular detection area, but is instead responsive to pressure variations. (Col. 5, ll. 10-45.)

Referring to Figures 4 and 5 of Berni, a "beam control and steering" system is also illustrated. One of ordinary skill in the art will recognize that this beam control and steering system is used to ensure that the laser is focused on a stationary area than rather successively on each of a plurality of non-discrete, overlapping segments. This is supported by the fact that Figure 5 shows that the beams are controlled and steered onto specific inertial mirrors which will have a fixed position on the ground surface.

In addition, the methods and apparatuses disclosed by Berni simply cannot monitor successively each of a plurality of non-discrete, overlapping segments defining a detection area. For example, Berni describes a typical airborne laser system according to the disclosed invention. (See generally col. 5, l. 46 -- Col. 6, 5.) In this example, an aircraft carrying the detection equipment flies at about 3,300 feet and samples the ground every 13 feet. The size of each detection area (or spot) is about 20 inches. Based upon a maximum detection period of ten seconds (col. 9, ll. 11-46), an aircraft traveling at a speed of, for example, 200 miles per hour (or about 290 feet per second) would cover nearly 3000 feet. Berni, however, fails to explain how such a large distance can accommodate a 20-inch detection area every 13 feet.

Therefore, claims 1 and 21, as amended, are allowable. Amended claims 2, 4, 6-20, and 32, which depend from amended claim 1 and amended claims 22-31, which depend from amended claim 21, are therefore also allowable for at least the same reasons. Claim 14 is also allowable because Donskoy fails to make up for the deficiencies of Berni discussed above. The rejections of claims 2, 4, 6-20, and 22-32 are traversed, but not expressly argued herein, in view of the allowability of the underlying base claims.

New Claims

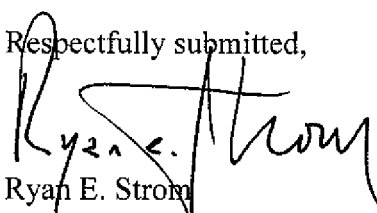
New claim 34 has been added and is directed to a method of seismic exploration. New claim 35 has been added and is directed to an apparatus for carrying out seismic exploration. Support for new claims 34 and 35 can be found throughout the application as filed. Therefore, no new matter has been added.

Conclusion

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,


Ryan E. Strom
Registration No. 58,525

Customer No. 24113
Patterson, Thunte, Skaar & Christensen, P.A.
4800 IDS Center
80 South 8th Street
Minneapolis, Minnesota 55402-2100
Telephone: (612) 349-3011